TABLE 2.—*Free-air resultant winds (m. p. s.) during October, 1922.*

Altitude, m. s. l. (m.)	Broken Arrow, Okla. (233m.)				Drexel, Nebr. (396m.)				Due West, S. C. (217m.)				Ellendale, N. Dak. (444m.)				Groesbeck, Tex. (141m.)				Royal Center, Ind. (225m.)			
	Mean.		5-year mean.		Mean.		7-year mean.		Mean.		2-year mean.		Mean.		5-year mean.		Mean.		5-year mean.		Mean.		5-year mean.	
	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.
Surface	S. 8° W.	1.5	S. 5° W.	2.6	S. 24° W.	2.6	S. 30° W.	1.5	N. 44° E.	1.9	N. 39° E.	1.9	N. 53° W.	2.4	N. 58° W.	1.9	N. 52° E.	1.6	S. 44° E.	0.7	S. 48° W.	2.8	S. 41° W.	2.5
250	S. 7° W.	1.5	S. 4° W.	2.7	.....	.....	.....	.....	N. 41° E.	2.1	N. 39° E.	1.9	.....	.....	.....	.....	N. 62° E.	2.2	S. 30° E.	1.5	S. 50° W.	2.9	S. 41° W.	2.8
500	S. 13° W.	1.7	S. 12° W.	3.8	S. 28° W.	3.5	S. 33° W.	2.1	N. 51° E.	2.8	N. 43° E.	2.6	N. 54° W.	2.5	N. 61° W.	1.8	N. 70° E.	2.4	S. 13° E.	2.8	S. 61° W.	5.1	S. 51° W.	4.9
750	S. 23° W.	2.1	S. 17° W.	4.4	S. 39° W.	4.9	S. 46° W.	3.5	N. 67° E.	2.5	N. 53° E.	2.1	N. 73° W.	3.4	N. 67° W.	2.6	N. 81° E.	2.8	S. 5° E.	3.2	S. 77° W.	6.3	S. 59° W.	6.1
1,000	S. 33° W.	2.1	S. 24° W.	4.5	S. 51° W.	5.4	S. 58° W.	3.8	N. 78° E.	1.9	N. 54° E.	1.2	N. 78° W.	4.3	N. 69° W.	3.1	N. 80° E.	2.5	S. 3° W.	3.3	S. 79° W.	6.7	S. 65° W.	6.8
1,250	S. 31° W.	1.9	S. 35° W.	4.5	S. 60° W.	6.0	S. 63° W.	4.6	N. 85° E.	1.4	S. 84° E.	0.4	N. 81° W.	5.6	N. 75° W.	3.9	N. 84° E.	2.5	S. 13° W.	3.5	S. 86° W.	8.2	S. 67° W.	7.9
1,500	S. 40° W.	2.0	S. 43° W.	4.5	S. 65° W.	6.8	S. 71° W.	5.5	N. 75° E.	0.6	S. 48° W.	0.8	N. 77° W.	6.4	N. 79° W.	4.6	N. 56° E.	2.7	S. 25° W.	3.5	N. 85° W.	8.9	S. 72° W.	8.5
2,000	S. 52° W.	2.3	S. 50° W.	5.2	S. 68° W.	6.8	S. 79° W.	7.1	S. 54° W.	2.1	S. 68° W.	2.8	N. 77° W.	7.8	N. 79° W.	6.4	N. 34° E.	2.3	S. 45° W.	3.4	N. 84° W.	9.8	S. 75° W.	9.4
2,500	S. 69° W.	2.9	S. 61° W.	5.5	S. 80° W.	5.8	S. 81° W.	8.3	S. 66° W.	4.4	S. 81° W.	5.0	N. 77° W.	9.8	N. 77° W.	8.0	N. 36° E.	3.2	S. 57° W.	3.3	N. 79° W.	12.4	S. 80° W.	10.6
3,000	S. 85° W.	3.4	S. 69° W.	6.3	S. 76° W.	7.1	S. 85° W.	9.7	S. 65° W.	8.2	S. 80° W.	7.3	N. 68° W.	11.1	N. 78° W.	9.4	N. 42° E.	2.8	S. 63° W.	3.9	N. 76° W.	14.8	S. 83° W.	11.7
3,500	S. 64° W.	4.4	S. 70° W.	7.3	N. 85° W.	8.2	N. 86° W.	11.0	S. 76° W.	7.3	N. 89° W.	8.8	N. 75° W.	12.0	N. 85° W.	11.4	S. 73° E.	1.9	S. 50° W.	3.9	S. 89° W.	14.3	S. 83° W.	13.7
4,000	S. 43° W.	7.0	S. 65° W.	9.2	S. 89° W.	10.0	N. 88° W.	11.3	S. 71° W.	17.4	S. 70° W.	14.7	N. 83° W.	12.3	W.	11.8	S. 58° E.	5.7	S. 41° W.	2.8	N. 89° W.	15.4	S. 88° W.	13.0
4,500	S. 28° W.	8.9	S. 77° W.	10.2	S. 58° W.	8.6	N. 77° W.	11.3	N. 88° W.	17.0	S. 82° W.	14.2	N. 86° W.	14.2	S. 82° W.	13.4	N. 80° E.	9.1	S. 70° E.	4.0	S. 45° W.	21.0	S. 85° W.	16.3
5,000	S. 45° W.	8.8	S. 71° W.	11.5	S. 87° W.	5.6	N. 69° W.	8.5	N. 68° W.	16.8	N. 68° W.	16.7	N. 59° W.	17.3	N. 86° W.	14.4	.....	.....	.....	.....	S. 45° W.	26.2	S. 76° W.	20.2

THE WEATHER ELEMENTS.

By P. C. DAY, Meteorologist, in Charge of Division.

PRESSURE AND WINDS.

Compared with September the average pressure for October increases over all districts of both the United States and Canada, save from the Great Lakes eastward, where the increasing storm activity during October over the more stable conditions existing in September causes a general reduction in the average pressure in the district mentioned, as compared with the preceding month. In the far Northwest the permanent high-pressure area over the adjacent ocean during the warmer months of the year has usually advanced slightly inland by October, with the center of highest pressure over the interior portions of Oregon and Washington. Over the southeastern districts the permanent high pressure off the adjacent coast has likewise moved toward the land area and the center of highest pressure in October is usually over the southern Appalachian Mountain district.

During October, 1922, the areas of highest and lowest average pressure assumed nearly their normal locations, but the average pressure was on the whole below normal, this being particularly the case over the more easterly districts of both the United States and Canada. Over a narrow belt extending from the southern California coast to eastern Montana, western North Dakota, and the adjacent portions of the Canadian Northwest the average pressure was slightly above the normal.

Compared with the preceding month, the average pressure during October was decidedly lower, particularly from the Great Lakes eastward, where cyclonic disturbances were rather frequent during the last two decades. From the Great Plains westward the pressure during October, 1922, was higher than in the preceding month, but the excess was generally less than usually occurs.

Anticyclonic conditions existed over much of the country during the early part of the month; indeed, pressure was moderately high almost continuously over the districts from the Mississippi River westward until near the end of the month. As a result of this distribution of pressure, cyclones were confined mainly to the more eastern districts and even here they were mainly unimportant and occurred at infrequent intervals, save along the northern border from the Great Lakes eastward.

In the absence of important cyclones the air movement was moderate, and few damaging winds were reported.

Over the districts from the Mississippi River eastward the winds were mainly outward from the center of highest pressure, located over the southern Appalachian Mountains. In the Great Plains region they were largely from southerly points, except in the upper Missouri Valley, where they were from northwest to north. Over the districts to westward of the Rocky Mountains they were variable, as usual. A list of the comparatively few damaging windstorms of the month appears at the end of this section.

TEMPERATURE.

The outstanding feature of the weather during the month was the uniformly favorable temperature. Little uncomfortable cold occurred, and the changes from day to day were usually small.

The first decade of the month was nearly everywhere warmer than normal, the excess ranging up to as much as 12° per day in the middle Plains region. During this period the highest temperatures of the month were recorded in practically all portions of the country, and over the interior portions the highest ever observed in October were reported from numerous places.

At the beginning of the second decade an anticyclone of considerable magnitude was advancing into the upper Missouri Valley and the coldest weather of the season to date was reported from the adjacent Canadian Provinces. This anticyclone advanced rapidly southeastward during the following few days, attended by freezing temperatures as far south as Kansas and Iowa, and frosts were reported from portions of the Ohio Valley and Appalachian Mountain regions.

The week ending the 17th was on the whole colder than normal by several degrees over a wide area embracing most of the central valleys and southeastern districts. It continued slightly warmer than normal from the west Gulf coast northwestward to Oregon and Washington, and generally over the Northeastern States. The lowest temperatures of the month occurred during this week over large areas from the middle Plains northward to Canada.

For the week ending the 24th, temperatures continued generally below normal over the Great Lakes and in the Ohio and Mississippi Valleys, and cool weather extended over New England and into Texas and New Mexico. Over the Northwest and generally from the Rocky Mountains westward the averages for the week were above normal; the lowest temperatures of the month occurred during this period over most districts from the Mississippi River eastward and in portions of the southern Plains.

The closing week of the month was unseasonably warm over the great central valleys, and, except for small areas in the Northeast and over the far Southwest, the week was generally warmer than average over all portions of the country, the departures ranging up to as much as 18° in the middle Missouri Valley. The lowest temperatures of the month occurred, however, during the first day or two of this week over portions of the Gulf States and the last two or three days were the coldest of the month from the Rocky Mountains westward.

For the month as a whole average temperatures were above normal over all portions of the country, save over a narrow area from the Lake Erie region northeastward, along the immediate middle Gulf coast, and in the Great Valley of California. In Canada also the month was mainly warmer than normal, save over the northern portions of the Maritime Province and in the vicinity of Lake Superior.

Maximum temperatures were very generally above 90° on a number of dates during the first decade, reaching 102° in South Dakota on the 4th and 106° in Arizona on the 2d.

Freezing weather occurred in all the States except Florida, but in the Southeast only the more northern portions of the Gulf States and the elevated sections of the South Atlantic States had injurious frosts. On account of the warm and dry weather of the preceding month, which continued over so much of the country during October, all late crops were fully matured before injurious frosts occurred.

PRECIPITATION.

As was the case in the preceding month, precipitation was deficient over the greater part of the country; only a few of the States along the south Atlantic and east Gulf coasts and those bordering the Pacific had statewide averages appreciably above the normal.

Despite the general deficiency in the monthly totals, the rains were usually well distributed through the various parts of the month, so that in most sections no long periods were without some rain. However, drought existed during the latter part of September over extensive areas and this was not generally relieved until toward the latter part of the first decade in October over most northern and central districts. In portions of the western Plains and generally in the southern Rocky Mountain districts drought more or less severe has continued for several months, and the need of water and forage for stock was becoming serious.

On the other hand, unusually heavy precipitaion occurred in southern Florida, particularly in the Everglades, which were overflowed in certain sections to the depth of 2 to 3 feet, so fall crops were largely destroyed. Even outside the Everglades vegetables and citrus fruits were more or less damaged on account of flooded conditions.

The principal periods of precipitation were from the 6th to 9th over the districts from the Great Plains eastward, the falls during this period being quite heavy in the South Atlantic and Gulf States and portions of the Mississippi and Ohio Valleys.

Important rains occurred from the 9th to 11th over the more eastern districts, some heavy local falls occurring over the Atlantic coast. In the vicinity of Baltimore torrential rains occurred during the night of the 9th–10th, the amounts measured at the Weather Bureau station in Baltimore exceeding any previous record for a similar period, 5.18 inches falling in slightly more than eight hours.

Another rainy period set in over the Southeastern States on the 12th and extended northward along the Atlantic coast for several days. Over much of Florida rain was more or less continuous and at times heavy for a week or more about this time.

During the latter part of the month precipitation was mostly light and scattered, although there were beneficial rains over wide areas from the Mississippi Valley eastward on the 23d–24th, and some heavy local falls in Texas and to the northward at the end of the month.

Over Florida, over the Atlantic Coast States as far north as Virginia, and in portions of the Gulf States the total precipitation for the month ranged from 4 to 6 inches or more. In other districts from the Great Plains eastward the amounts were usually less than 2 inches, with occasional amounts exceeding 4 inches. Over the greater part of the western Plains, the Rocky Mountains, and Plateau States the total falls were less than one-half inch, and practically no rain fell over large areas of the southern portions of those regions.

The maximum fall during the month was 23.89 inches, at Homestead, Fla.

SNOWFALL.

In most high portions of the mountain districts of the West there was some snowfall during the month, but scarcely anywhere were the falls notable for the time of year. In parts of the Plateau region, and in central and northeastern Wyoming, the Black Hills district, eastern Montana, and much of North Dakota there was considerable snow during the last few days of the month, also from North Dakota to the vicinity of Lake Superior there was moderate snowfall about the 16th or 17th. Otherwise the snowfall of the month was unimportant.

RELATIVE HUMIDITY.

In nearly all portions of the country, even in some where there was a moderate excess of precipitation, the relative humidity was less than normal. The humidity was especially less than normal in the Plateau, Rocky Mountain, and Plains regions, and was somewhat less in the west Gulf area, the central valleys, and the Northeast. In Florida and the east Gulf States, however, there was slightly greater humidity than usual in October, and excess is noted also in the Pacific Northwest and northern California.